To. Dr AK

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Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

I SEMESTER MSc. Physics

END SEMESTER EXAMINATIONS, NOV 2016

SUBJECT: Fundamentals of Electronics (PHY 607)

Time: 3 Hours MAX. MARKS: 50

- Answer **ANY FIVE FULL** questions.

1A. Draw the a.c. equivalent circuit for bipolar junction transistor in common emitter configuration and obtain the expressions for the following parameters: (i) input impedance (ii) voltage gain (iii) output impedance. **(6 M)**

1B. Determine the following for the network of Fig. 1.
(a) V_D. Given I_{DQ}= 2.4mA and V_{GSQ}= −1.8V
(b) V_S.
(c) V_{DS}.
(d) V_{DG}.

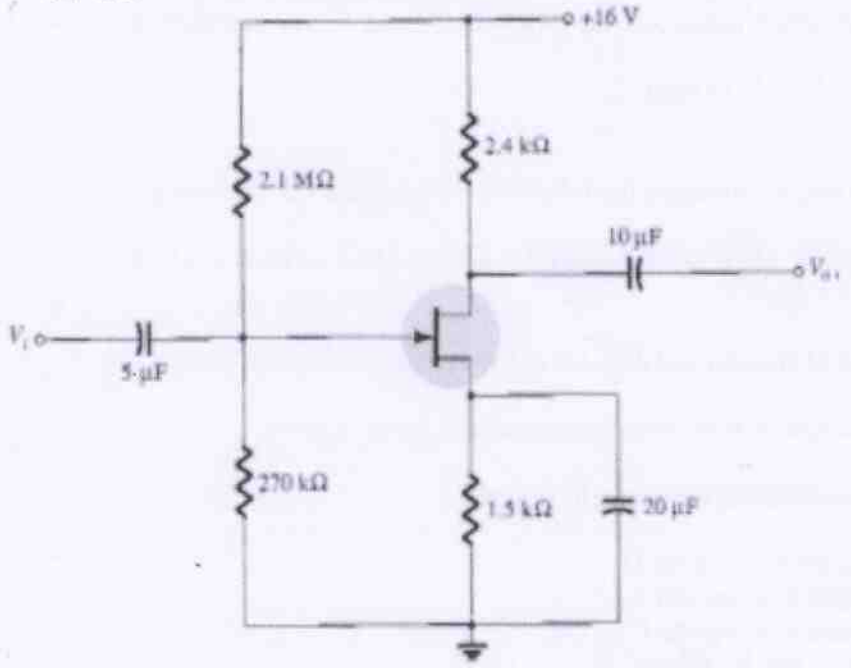


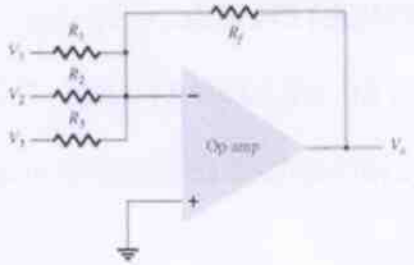
Fig.1 **(4M)**

2A. Dicuss how Timmer 555 can be used as monostable multivibrator. **(5 M)**

2B. Draw the circuit diagram of high pass filter using op-amp and derive the expression for its gain. **(5 M)**

3A. Discribe the working of UJT relaxation oscillator and obtain an expression for its time period. **(6 M)**

3B. Calculate the output voltage of the given op-amp summing amplifier for the following sets of voltages and resistors. R_f =1 MΩ V_1=1 V, V_2=2 V, V_3=3 V, R_1 =500kΩ, R_2 =1MΩ, R_3 = 1M Ω.



(2 M)

3C Draw the circuit diagram for adjustable voltage regulator using LM317. **(2M)**

4A. Discuss in detail the design of synchronous counter. **(6 M)**

4B. Determine the output voltage caused by most significant bit in a 3-bit ladder(R/2R) if the input levels are 0=0V and 1=10V. **(4 M)**

5A. Draw the circuit diagram of clocked J-K flip-flop with preset and clear inputs using NAND gates and explain its truth table. **(3 M)**

5B. (i) Convert the following decimal number to binary:
a) 45 b) 0.625 **(2M)**
(ii) Determine the decimal values of the following signed binary numbers expressed in 1's complement:
a) 00010111 b) 11101000 **(2 M)**

(iii) Use a Karnaugh map to minimize the following SOP expression

$$\bar{B}\bar{C}\bar{D}+\bar{A}B\bar{C}\bar{D}+AB\bar{C}\bar{D}+\bar{A}\bar{B}CD+A\bar{B}CD+\bar{A}\bar{B}C\bar{D}+\bar{A}BC\bar{D}+ABC\bar{D}+A\bar{B}C\bar{D}$$

(3 M)

6A. Explain the functions of encoder and decoder and give an application of each. **(3 M)**

6B. Describe the bus structure of 8085 microprocessor with block diagram. **(4 M)**

6C. Write a program to perform the following functions

a. Load the number 8BH in register D
b. Load the number 6FH in register C
c. Increment the content of register C by one
d. Add the contents of registers C and D
e. Display the sum at the output port1

(3 M)

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